



## **Early warning of climate tipping points: comparing methods to limit false alarms**

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We address whether robust early warning signals can, in principle, be provided before a climate tipping point is reached, focusing on methods that seek to detect critical slowing down as a precursor of bifurcation. As a test-bed, six previously analysed datasets are reconsidered, three paleo-climate records approaching abrupt transitions at the end of the last ice age, and three models of varying complexity forced through a collapse of the Atlantic thermohaline circulation. Approaches based on examining the lag-1 autocorrelation function (ACF), or on de-trended fluctuation analysis (DFA), are compared. The effects of aggregation of the data, de-trending method, sliding window length, and filtering bandwidth, are examined. Robust indicators of critical slowing down are found prior to the abrupt warming event at the end of the Younger Dryas.

[1] Lenton et al, Phil Trans Royal Soc A, submitted.